FIG.1

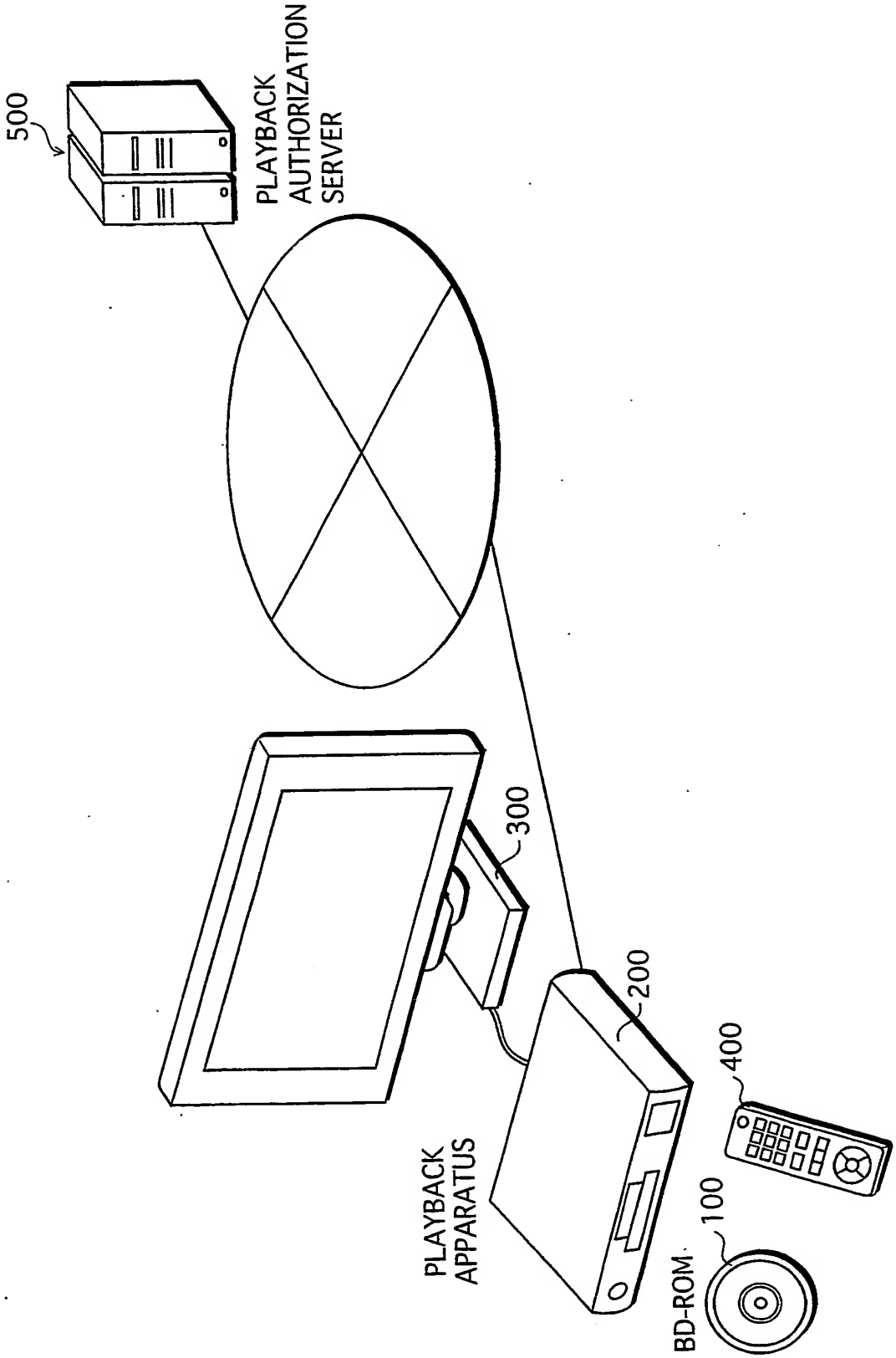

500
PLAYBACK AUTHORIZATION SERVER
300
200
400
PLAYBACK APPARATUS
100
BD-ROM

FIG.2

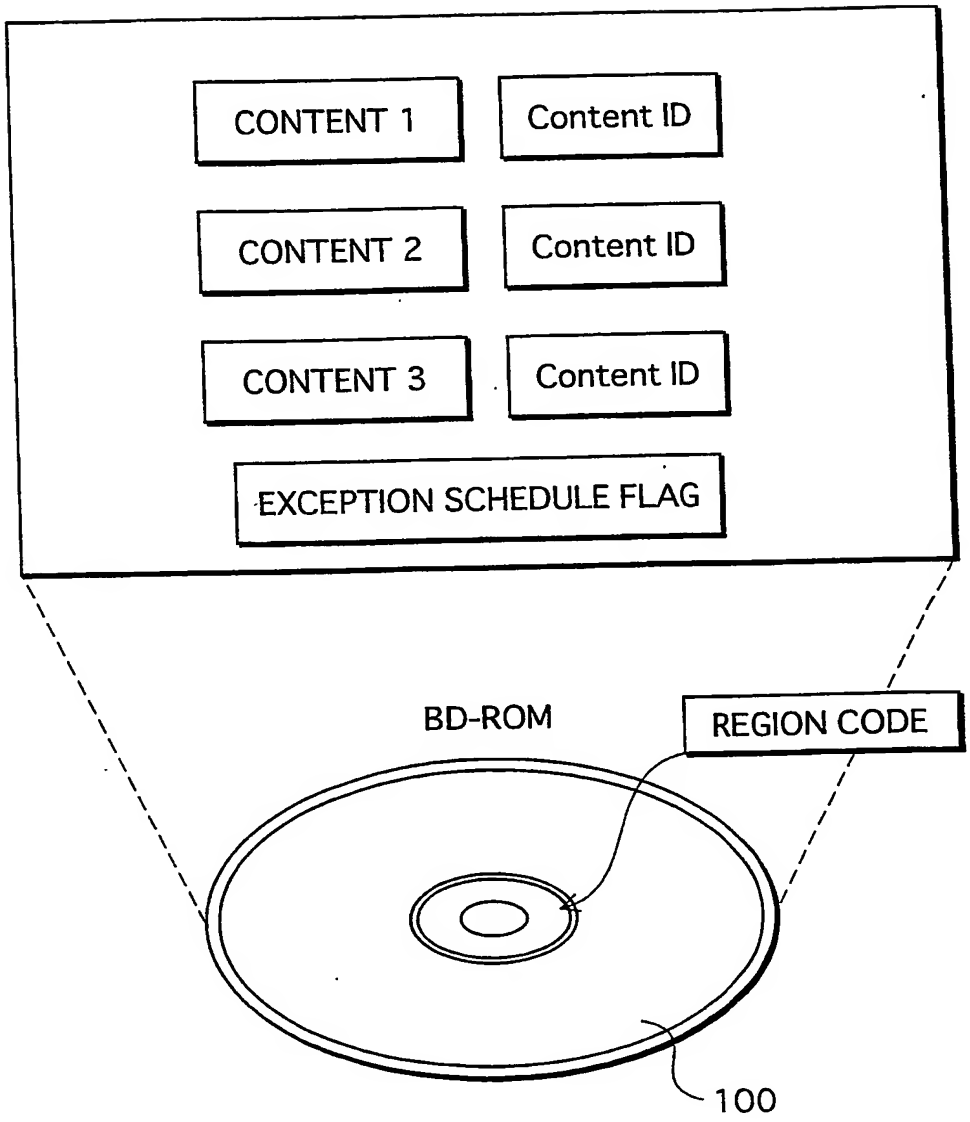

CONTENT 1
Content ID
CONTENT 2
Content ID
CONTENT 3
Content ID
EXCEPTION SCHEDULE FLAG
BD-ROM
REGION CODE
100

FIG.3

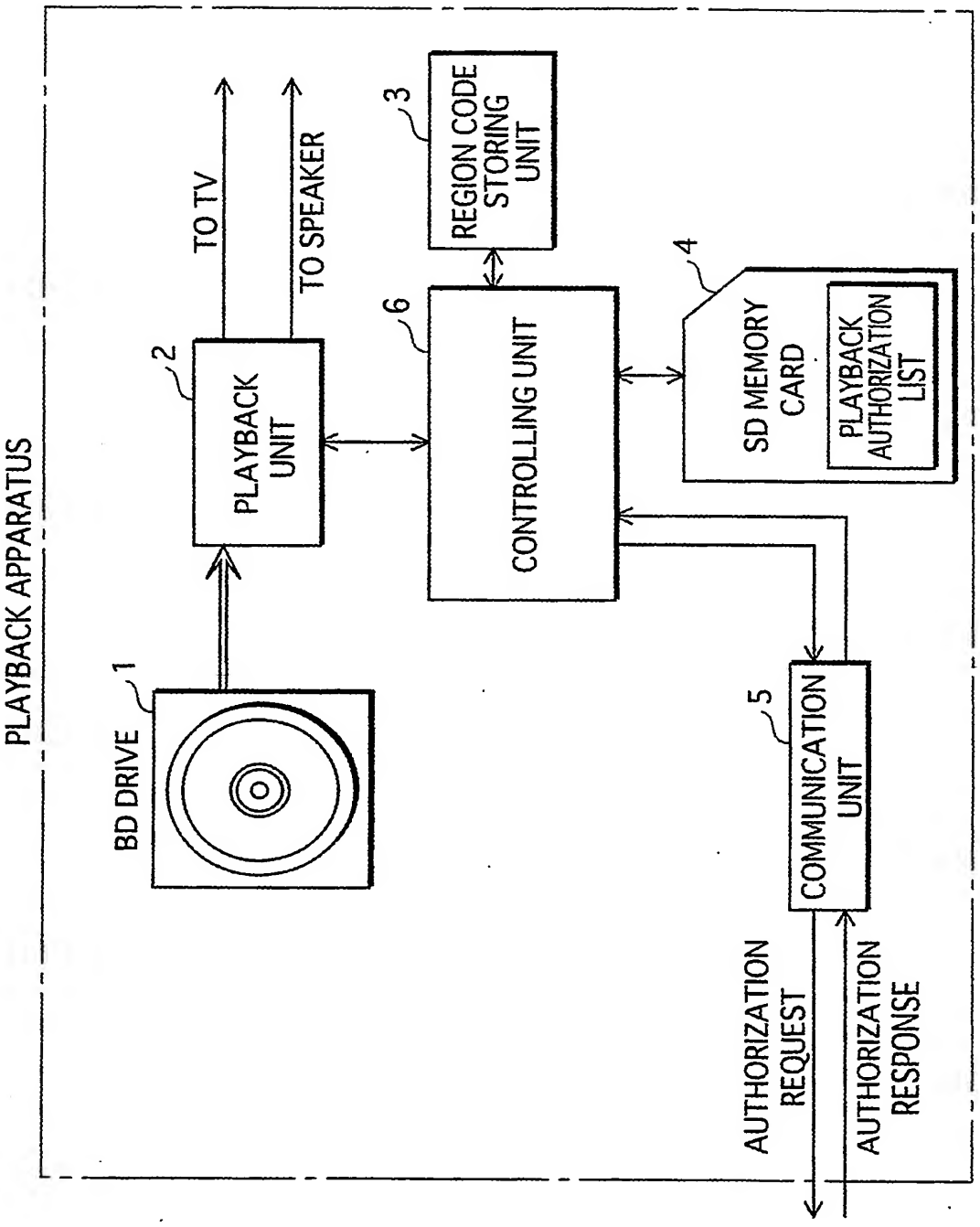

PLAYBACK APPARATUS
BD DRIVE
1
PLAYBACK UNIT
2
TO TV
TO SPEAKER
REGION CODE STORING UNIT
3
CONTROLLING UNIT
6
SD MEMORY CARD
4
PLAYBACK AUTHORIZATION LIST
COMMUNICATION UNIT
5
AUTHORIZATION REQUEST
AUTHORIZATION RESPONSE

FIG.4

PLAYBACK AUTHORIZATION LIST

	Content ID	Region Code	EXCLUSION INFORMATION	DISTRIBUTION COMPANY INFORMATION	RELEASE DATE INFORMATION
PLAYBACK AUTHORIZATION INFORMATION 1	4GH	1	EXCLUSIVE	COMPANY AAA	10/02/2002
PLAYBACK AUTHORIZATION INFORMATION 2	4GH	2	NON-EXCLUSIVE	COMPANY BBB	01/23/2002
PLAYBACK AUTHORIZATION INFORMATION 3	QW1	2	EXCLUSIVE	COMPANY CCC	01/24/1998

FIG.5

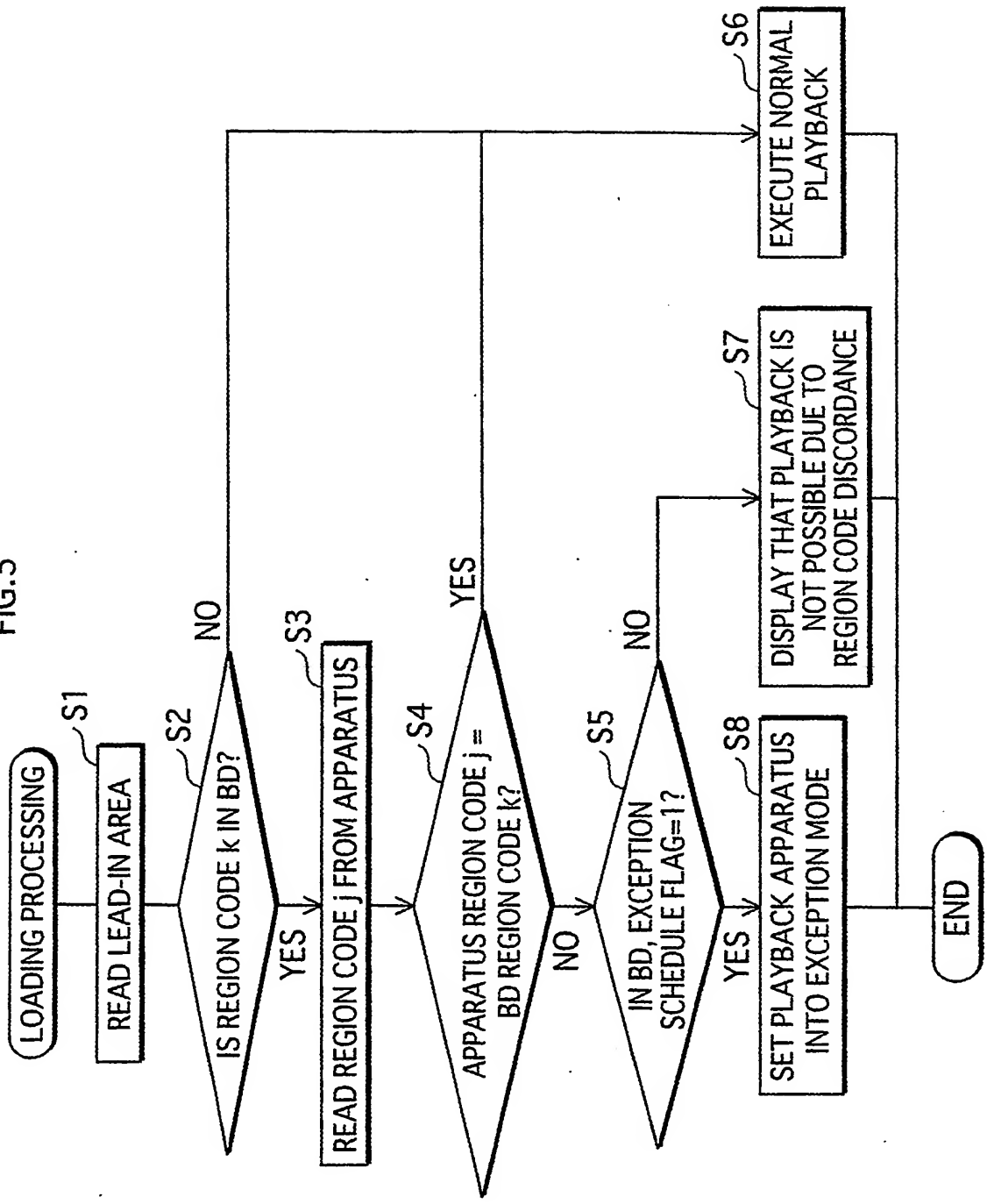

LOADING PROCESSING
S1
READ LEAD-IN AREA
S2
IS REGION CODE k IN BD?
NO
YES
S3
READ REGION CODE j FROM APPARATUS
S4
APPARATUS REGION CODE j = BD REGION CODE k?
YES
NO
S5
IN BD, EXCEPTION SCHEDULE FLAG=1?
NO
YES
S6
EXECUTE NORMAL PLAYBACK
S7
DISPLAY THAT PLAYBACK IS NOT POSSIBLE DUE TO REGION CODE DISCORDANCE
S8
SET PLAYBACK APPARATUS INTO EXCEPTION MODE
END

FIG.6

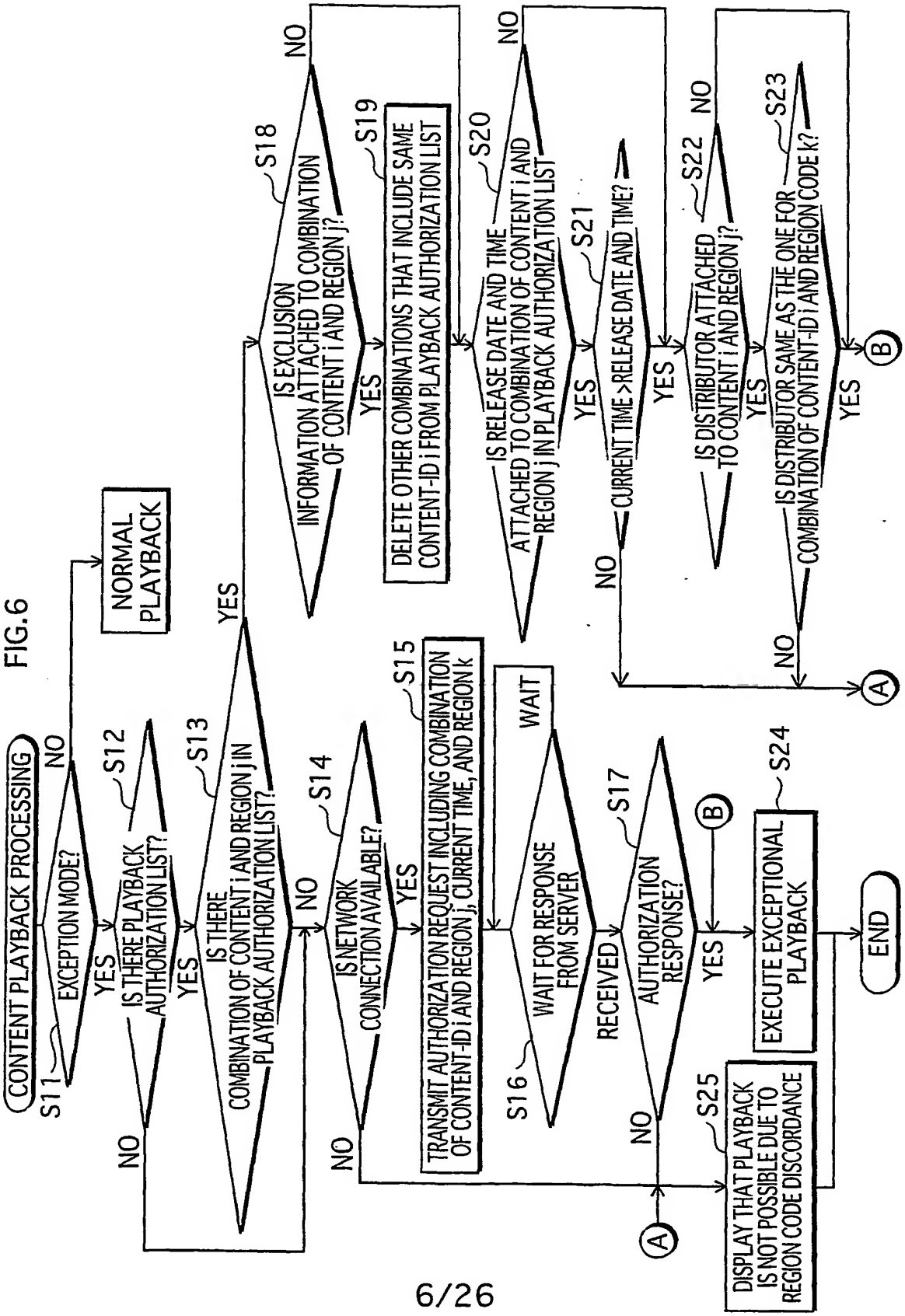

CONTENT PLAYBACK PROCESSING
S11
EXCEPTION MODE?
NO
YES
NORMAL PLAYBACK
S12
IS THERE PLAYBACK AUTHORIZATION LIST?
NO
YES
S13
IS THERE COMBINATION OF CONTENT i AND REGION j IN PLAYBACK AUTHORIZATION LIST?
NO
YES
S14
IS NETWORK CONNECTION AVAILABLE?
NO
YES
S15
TRANSMIT AUTHORIZATION REQUEST INCLUDING COMBINATION OF CONTENT-ID i AND REGION j, CURRENT TIME, AND REGION k
WAIT
S16
WAIT FOR RESPONSE FROM SERVER
S17
RECEIVED AUTHORIZATION RESPONSE?
NO
YES
B
S24
EXECUTE EXCEPTIONAL PLAYBACK
END
A
S25
DISPLAY THAT PLAYBACK IS NOT POSSIBLE DUE TO REGION CODE DISCORDANCE
S18
IS EXCLUSION INFORMATION ATTACHED TO COMBINATION OF CONTENT i AND REGION j?
NO
YES
S19
DELETE OTHER COMBINATIONS THAT INCLUDE SAME CONTENT-ID i FROM PLAYBACK AUTHORIZATION LIST
S20
IS RELEASE DATE AND TIME ATTACHED TO COMBINATION OF CONTENT i AND REGION j IN PLAYBACK AUTHORIZATION LIST
NO
YES
S21
CURRENT TIME > RELEASE DATE AND TIME?
NO
YES
S22
IS DISTRIBUTOR ATTACHED TO CONTENT i AND REGION j?
NO
YES
S23
IS DISTRIBUTOR SAME AS THE ONE FOR COMBINATION OF CONTENT-ID i AND REGION CODE k?
NO
YES
B
A

FIG.7

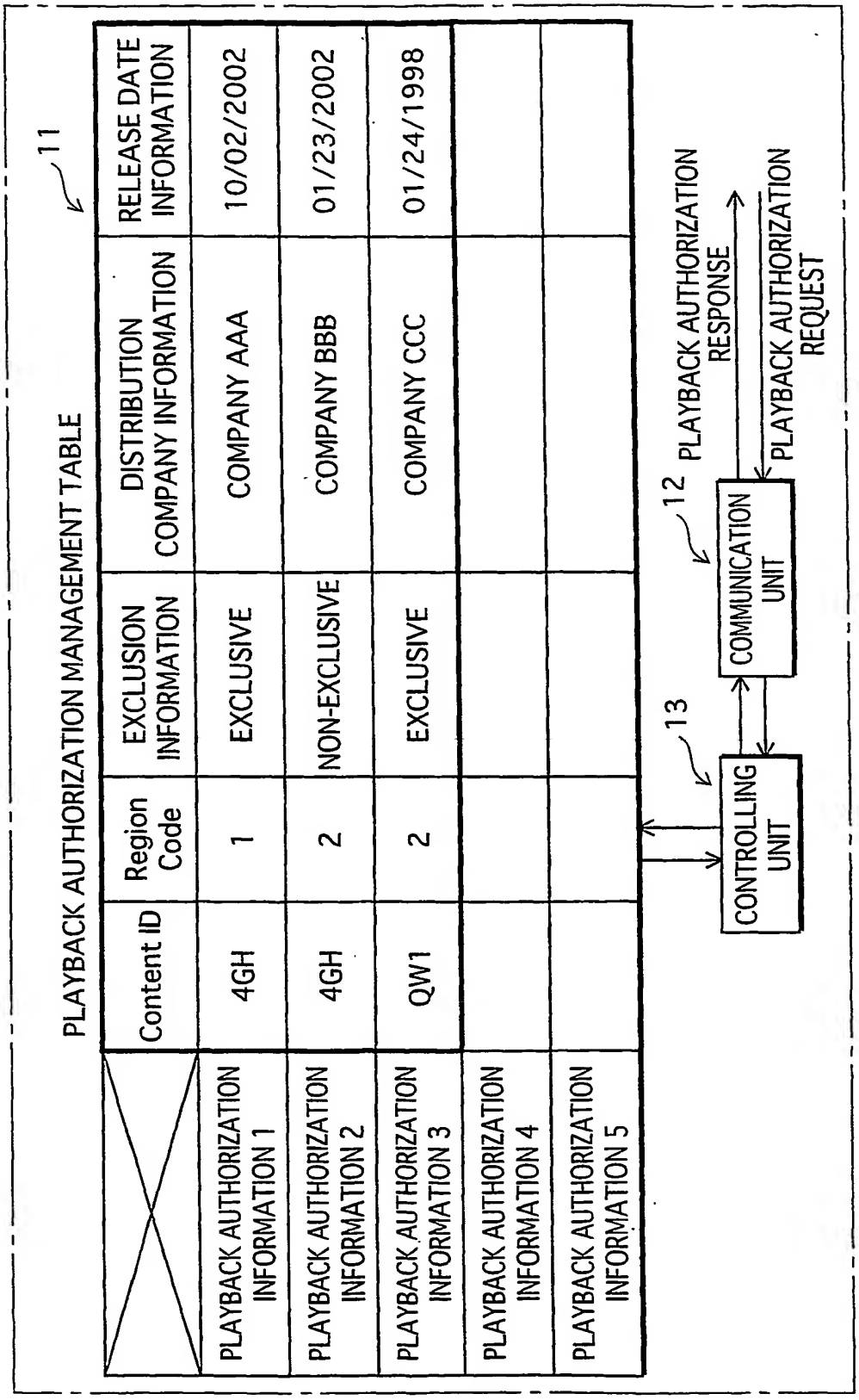

PLAYBACK AUTHORIZATION SERVER
PLAYBACK AUTHORIZATION MANAGEMENT TABLE
11
Content ID
Region Code
EXCLUSION INFORMATION
DISTRIBUTION COMPANY INFORMATION
RELEASE DATE INFORMATION
PLAYBACK AUTHORIZATION INFORMATION 1
4GH
1
EXCLUSIVE
COMPANY AAA
10/02/2002
PLAYBACK AUTHORIZATION INFORMATION 2
4GH
2
NON-EXCLUSIVE
COMPANY BBB
01/23/2002
PLAYBACK AUTHORIZATION INFORMATION 3
QW1
2
EXCLUSIVE
COMPANY CCC
01/24/1998
PLAYBACK AUTHORIZATION INFORMATION 4
PLAYBACK AUTHORIZATION INFORMATION 5
12
PLAYBACK AUTHORIZATION RESPONSE
PLAYBACK AUTHORIZATION REQUEST
COMMUNICATION UNIT
13
CONTROLLING UNIT

FIG.8

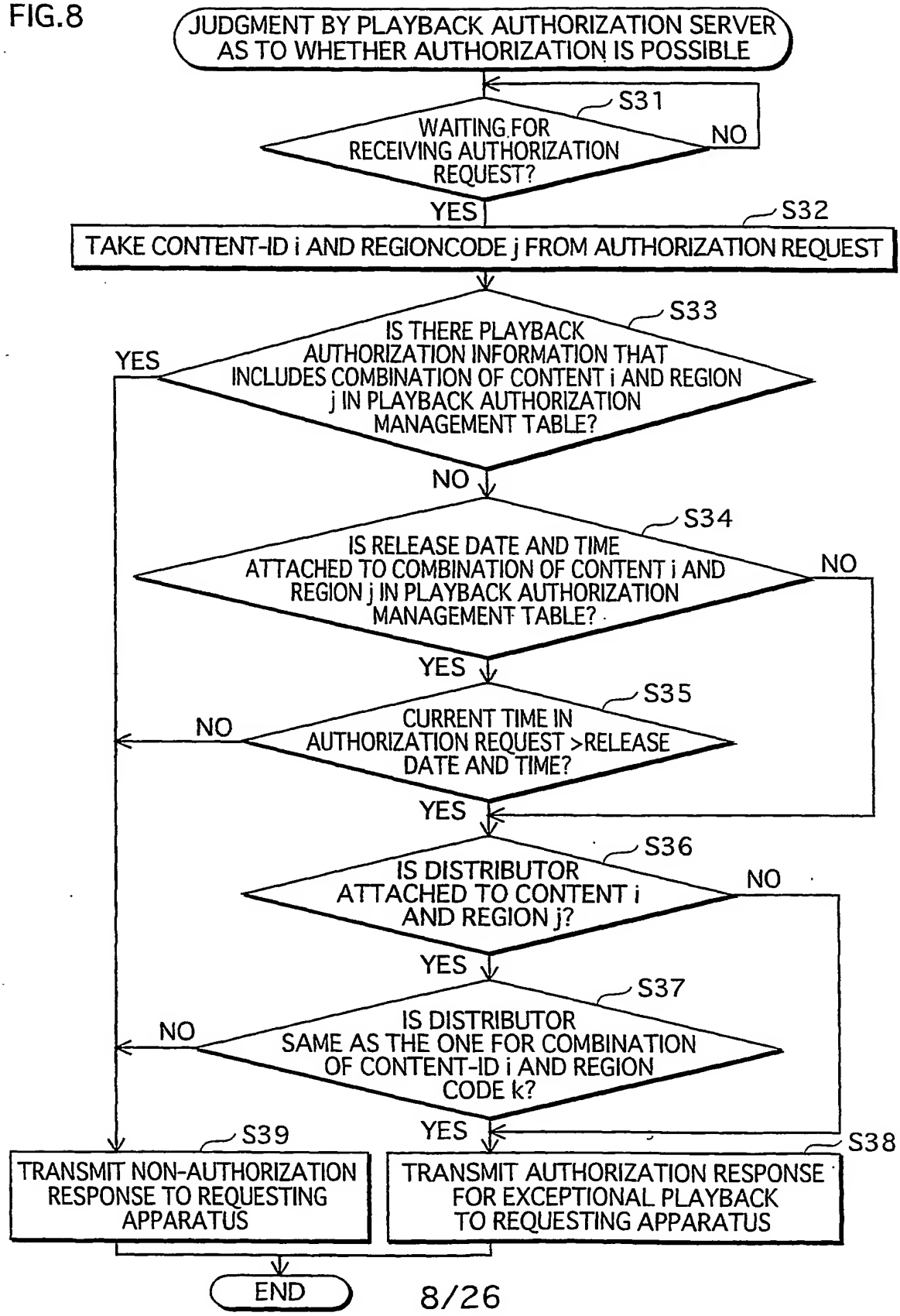

JUDGMENT BY PLAYBACK AUTHORIZATION SERVER AS TO WHETHER AUTHORIZATION IS POSSIBLE
S31
WAITING FOR RECEIVING AUTHORIZATION REQUEST?
NO
YES
S32
TAKE CONTENT-ID i AND REGIONCODE j FROM AUTHORIZATION REQUEST
S33
IS THERE PLAYBACK AUTHORIZATION INFORMATION THAT INCLUDES COMBINATION OF CONTENT i AND REGION j IN PLAYBACK AUTHORIZATION MANAGEMENT TABLE?
YES
NO
S34
IS RELEASE DATE AND TIME ATTACHED TO COMBINATION OF CONTENT i AND REGION j IN PLAYBACK AUTHORIZATION MANAGEMENT TABLE?
NO
YES
S35
CURRENT TIME IN AUTHORIZATION REQUEST >RELEASE DATE AND TIME?
NO
YES
S36
IS DISTRIBUTOR ATTACHED TO CONTENT i AND REGION j?
NO
YES
S37
IS DISTRIBUTOR SAME AS THE ONE FOR COMBINATION OF CONTENT-ID i AND REGION CODE k?
NO
YES
S39
TRANSMIT NON-AUTHORIZATION RESPONSE TO REQUESTING APPARATUS
S38
TRANSMIT AUTHORIZATION RESPONSE FOR EXCEPTIONAL PLAYBACK TO REQUESTING APPARATUS
END

FIG.9A

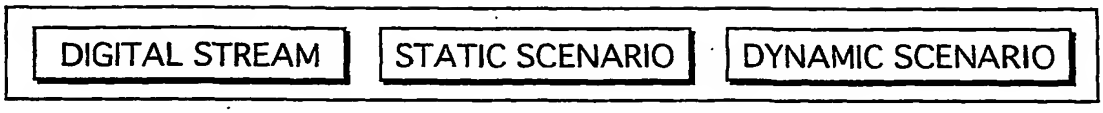

CONTENT
DIGITAL STREAM
STATIC SCENARIO
DYNAMIC SCENARIO

FIG.9B

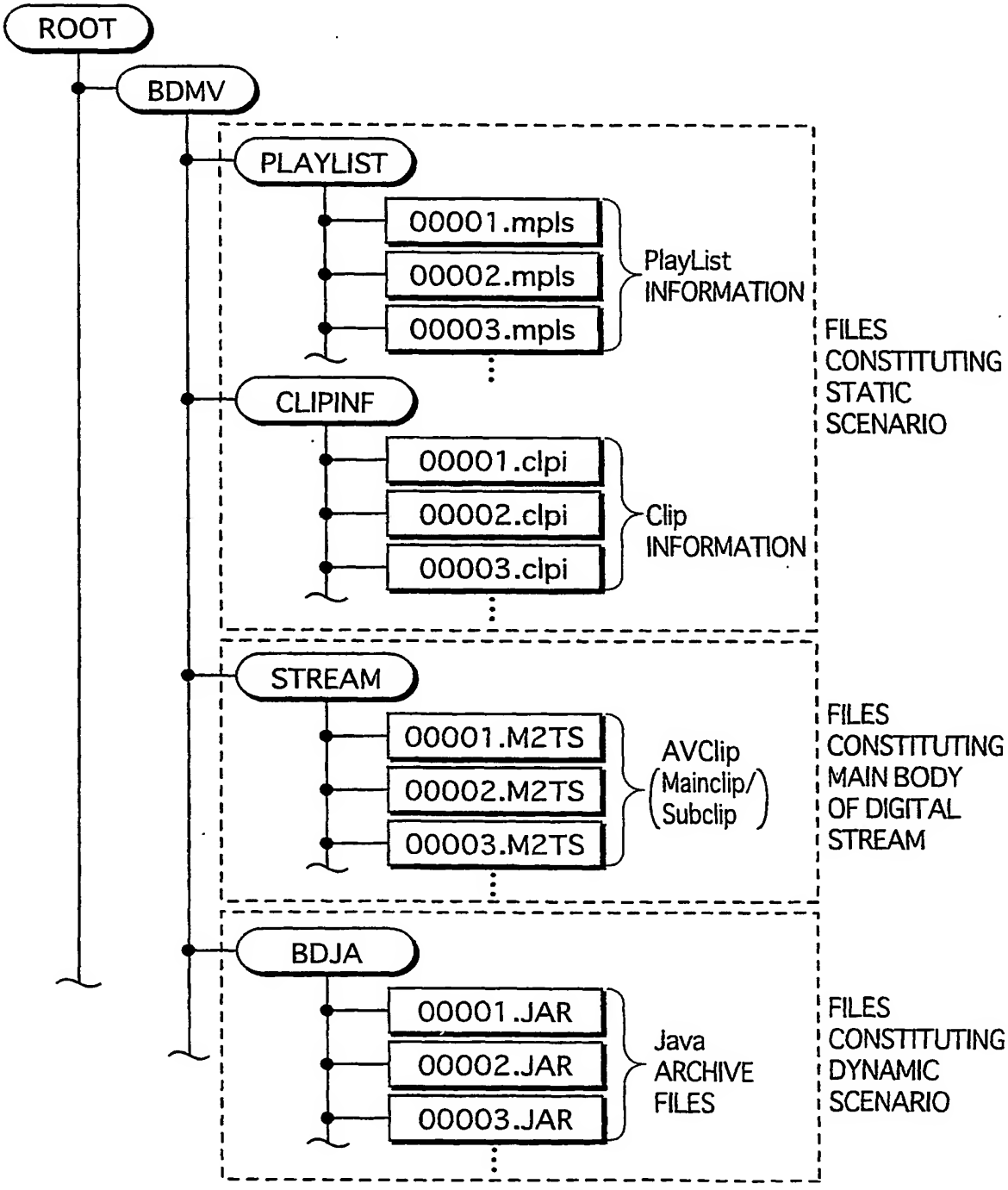

ROOT
BDMV
PLAYLIST
00001.mpls
00002.mpls
00003.mpls
PlayList INFORMATION
CLIPINF
00001.clpi
00002.clpi
00003.clpi
Clip INFORMATION
FILES CONSTITUTING STATIC SCENARIO
STREAM
00001.M2TS
00002.M2TS
00003.M2TS
AVClip (Mainclip/ Subclip)
FILES CONSTITUTING MAIN BODY OF DIGITAL STREAM
BDJA
00001.JAR
00002.JAR
00003.JAR
Java ARCHIVE FILES
FILES CONSTITUTING DYNAMIC SCENARIO

FIG. 10

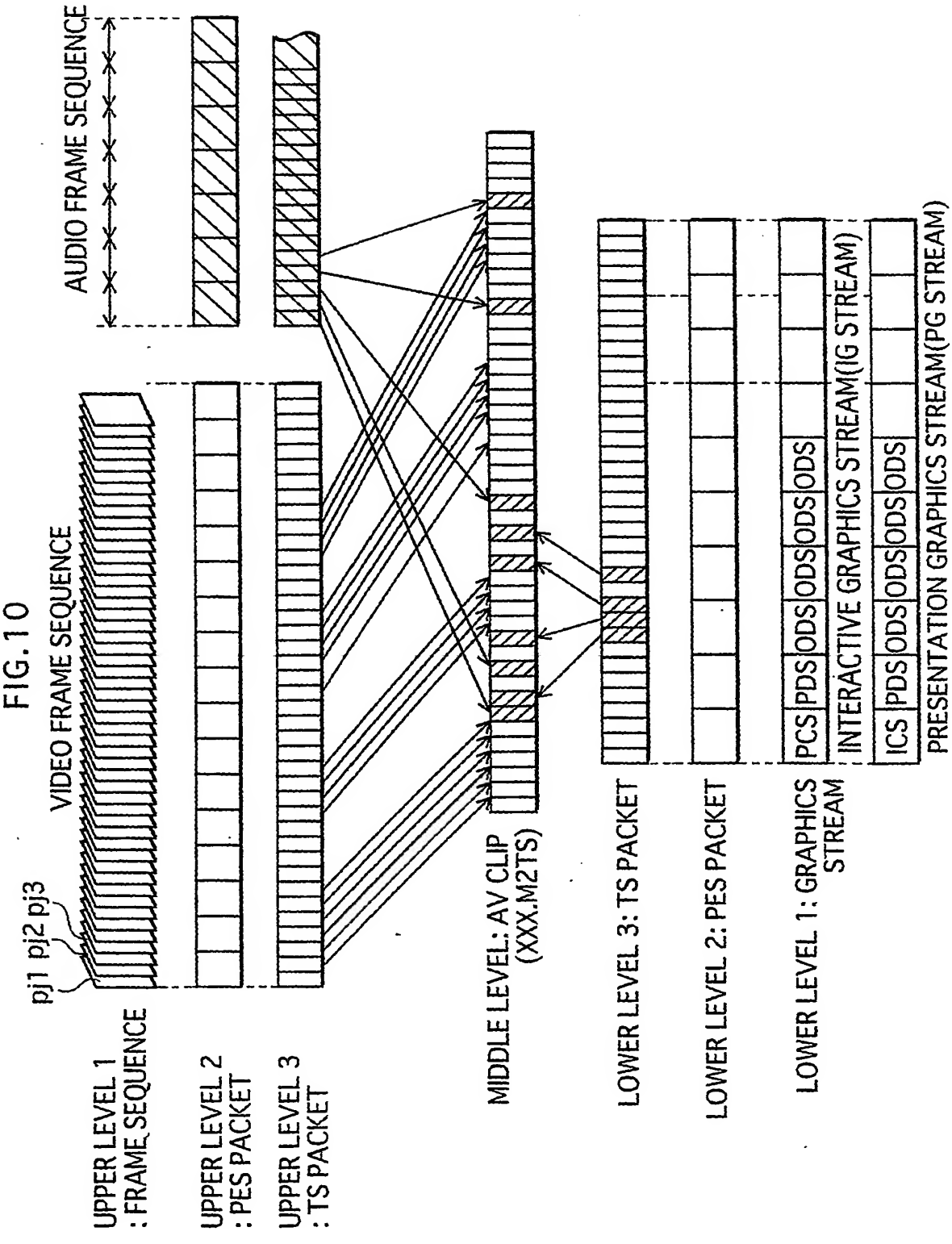

AUDIO FRAME SEQUENCE
VIDEO FRAME SEQUENCE
pj1 pj2 pj3
UPPER LEVEL 1 : FRAME SEQUENCE
UPPER LEVEL 2 : PES PACKET
UPPER LEVEL 3 : TS PACKET
MIDDLE LEVEL: AV CLIP (XXX.M2TS)
LOWER LEVEL 3: TS PACKET
LOWER LEVEL 2: PES PACKET
LOWER LEVEL 1: GRAPHICS STREAM
PCS PDS ODS ODS ODS ODS
INTERACTIVE GRAPHICS STREAM(IG STREAM)
ICS PDS ODS ODS ODS ODS
PRESENTATION GRAPHICS STREAM(PG STREAM)

FIG.11

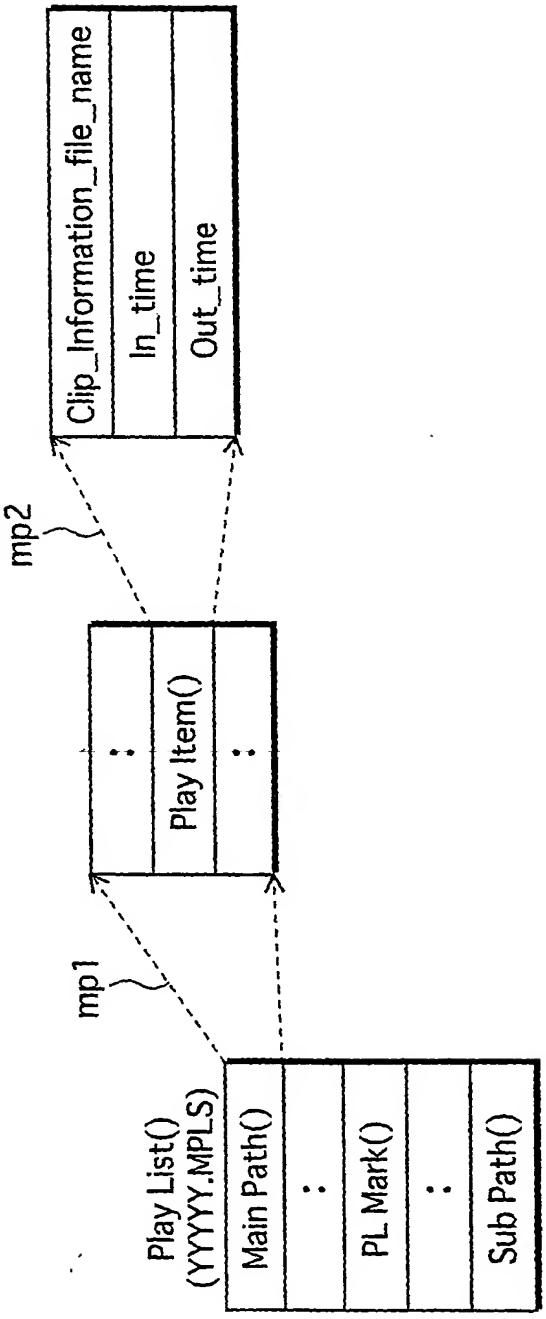

Clip_Information_file_name
In_time
Out_time
mp2
:
Play Item()
:
mp1
Play List()
(YYYYY.MPLS)
Main Path()
:
PL Mark()
:
Sub Path()

FIG.12

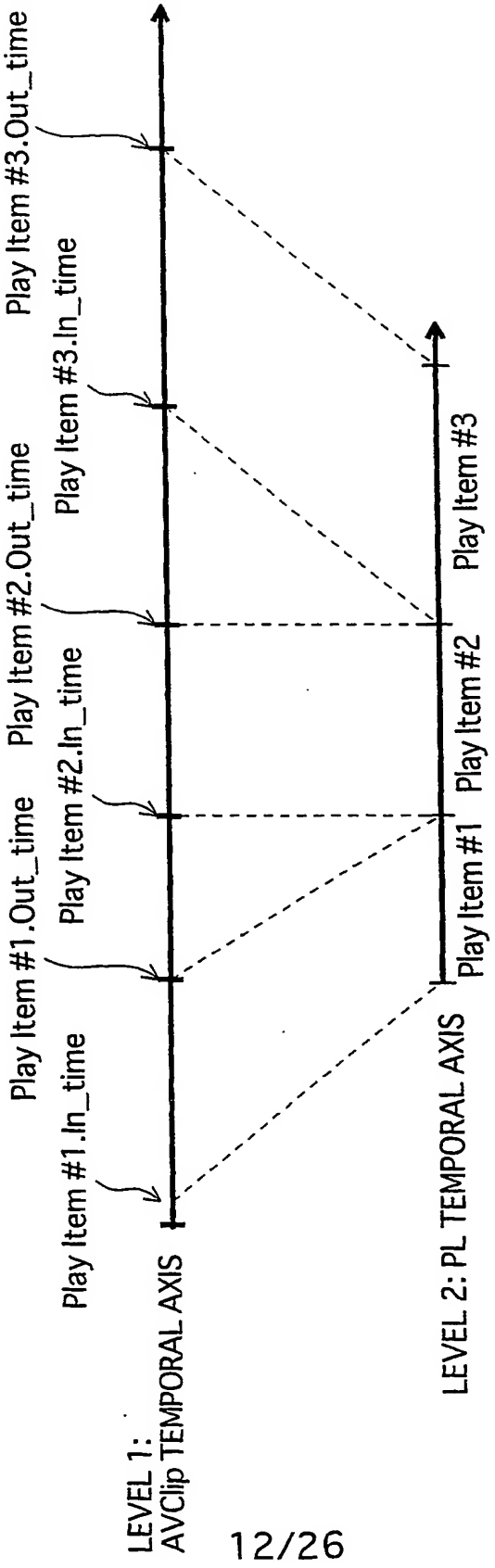

Play Item #3.Out_time
Play Item #3.In_time
Play Item #2.Out_time
Play Item #2.In_time
Play Item #1.Out_time
Play Item #1.In_time
LEVEL 1:
AVClip TEMPORAL AXIS
Play Item #1
Play Item #2
Play Item #3
LEVEL 2: PL TEMPORAL AXIS

FIG.13

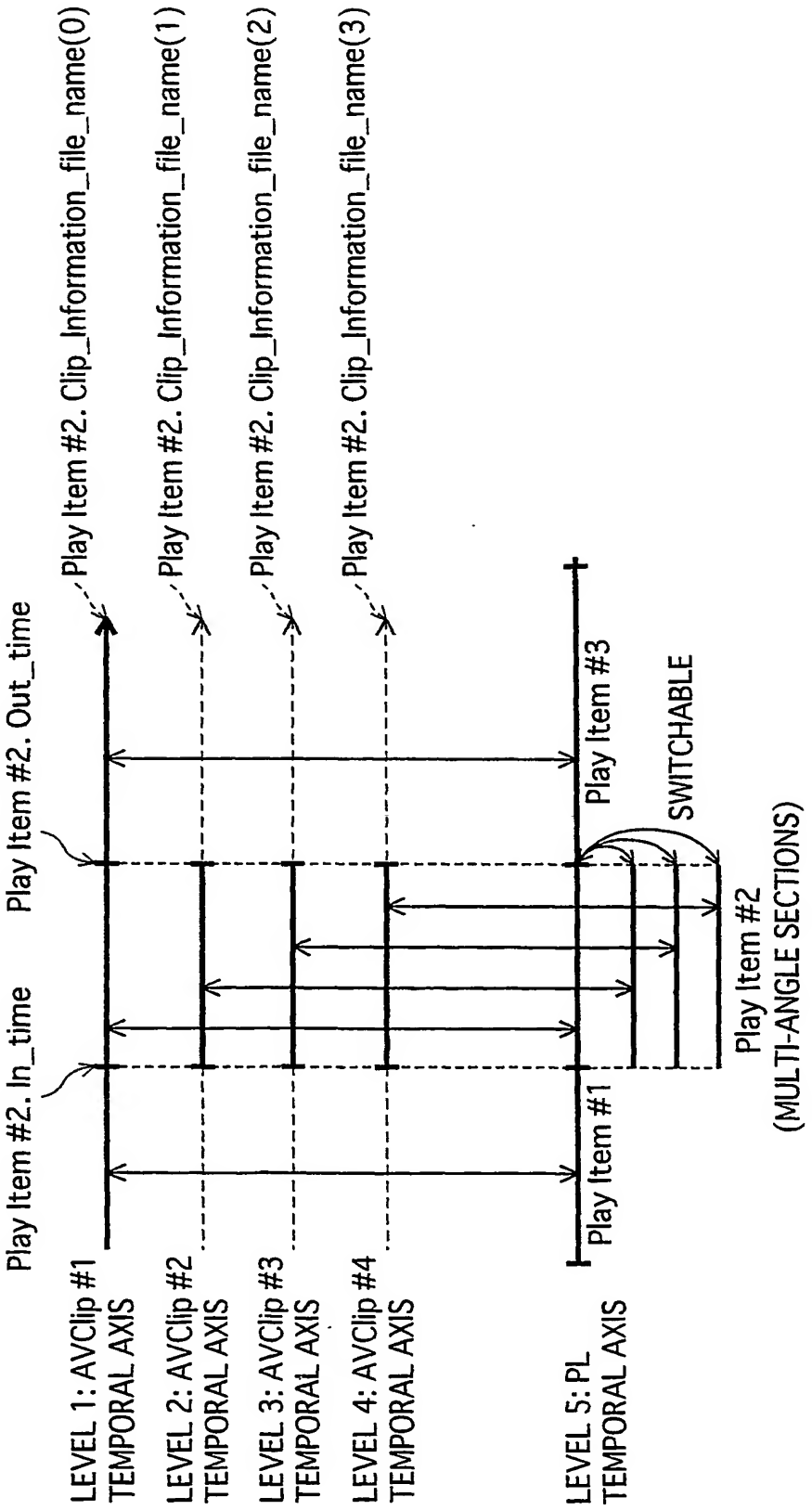

Play Item #2. Clip_Information_file_name(0)
Play Item #2. Clip_Information_file_name(1)
Play Item #2. Clip_Information_file_name(2)
Play Item #2. Clip_Information_file_name(3)
Play Item #2. Out_time
Play Item #2. In_time
Play Item #3
SWITCHABLE
Play Item #2
(MULTI-ANGLE SECTIONS)
Play Item #1
LEVEL 1: AVClip #1 TEMPORAL AXIS
LEVEL 2: AVClip #2 TEMPORAL AXIS
LEVEL 3: AVClip #3 TEMPORAL AXIS
LEVEL 4: AVClip #4 TEMPORAL AXIS
LEVEL 5: PL TEMPORAL AXIS

FIG.14

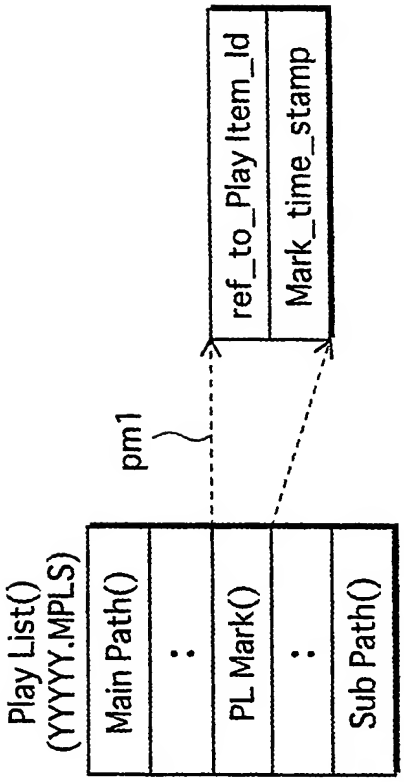

Play List()
(YYYY.MPLS)
Main Path()
PL Mark()
Sub Path()
pm1
ref_to_Play Item_Id
Mark_time_stamp

FIG.15

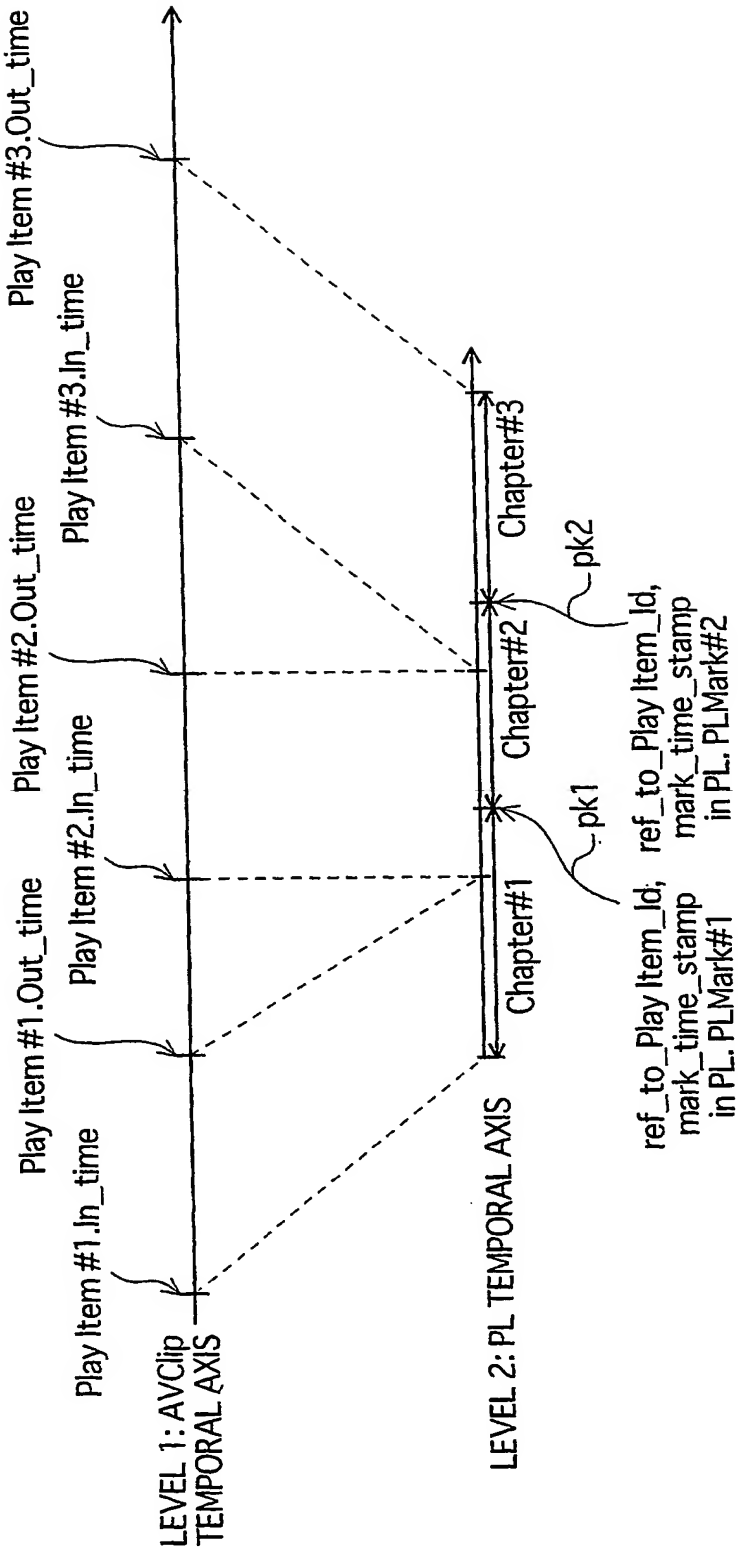

Play Item #1.In_time
Play Item #1.Out_time
Play Item #2.In_time
Play Item #2.Out_time
Play Item #3.In_time
Play Item #3.Out_time
LEVEL 1: AVClip TEMPORAL AXIS
LEVEL 2: PL TEMPORAL AXIS
Chapter#1
Chapter#2
Chapter#3
pk1
pk2
ref_to_Play Item_Id; mark_time_stamp in PL. PLMark#1
ref_to_Play Item_Id, mark_time_stamp in PL. PLMark#2

FIG.16

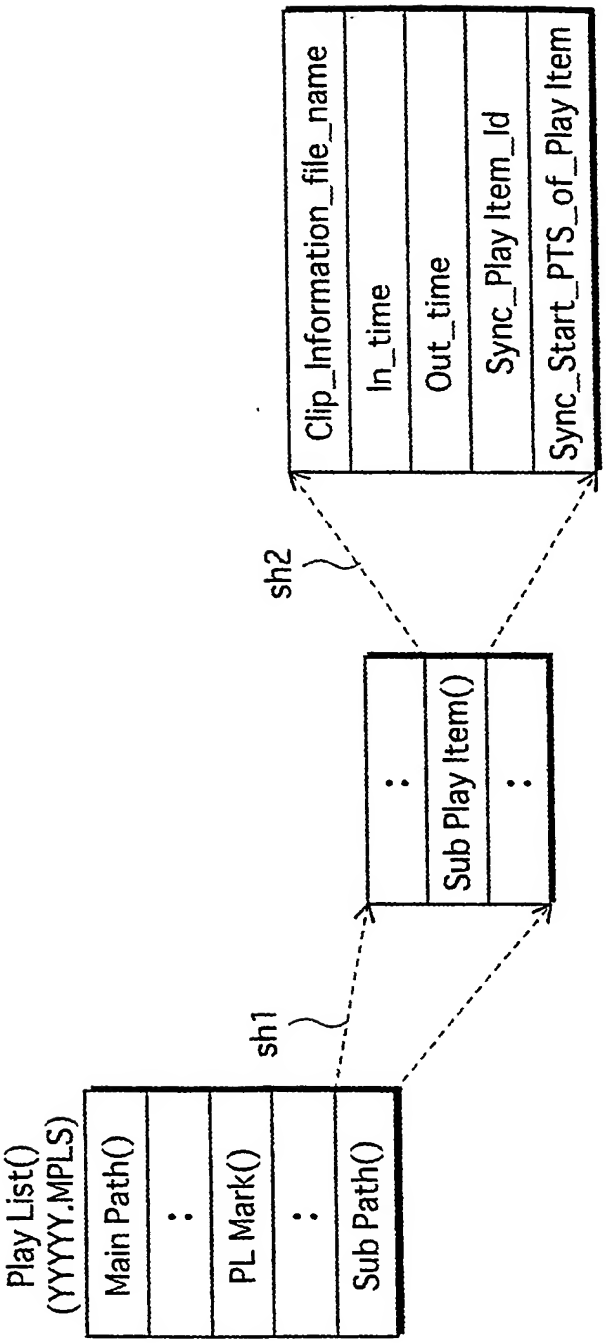

Play List()
(YYYYY.MPLS)
Main Path()
PL Mark()
Sub Path()
sh1
Sub Play Item()
sh2
Clip_Information_file_name
In_time
Out_time
Sync_Play Item_Id
Sync_Start_PTS_of_Play Item

FIG.17

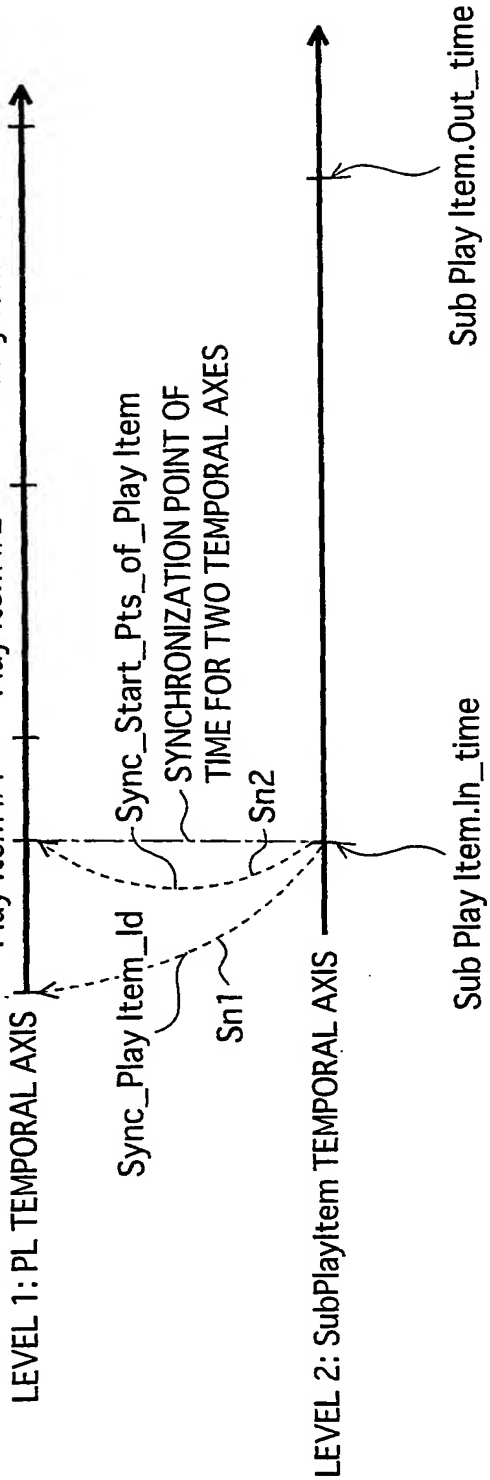

LEVEL 1: PL TEMPORAL AXIS
Play Item #1
Play Item #2
Play Item #3
Sync_Play Item_Id
Sn1
Sync_Start_Pts_of_Play Item
SYNCHRONIZATION POINT OF
TIME FOR TWO TEMPORAL AXES
Sn2
LEVEL 2: SubPlayItem TEMPORAL AXIS
Sub Play Item.In_time
Sub Play Item.Out_time

FIG.18A

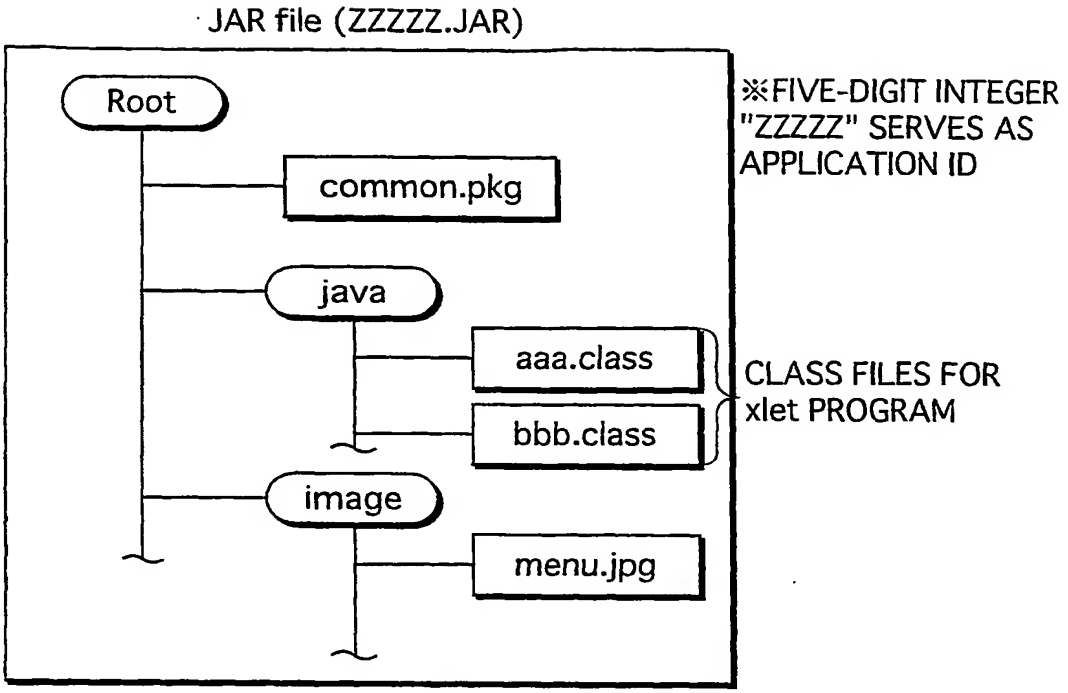
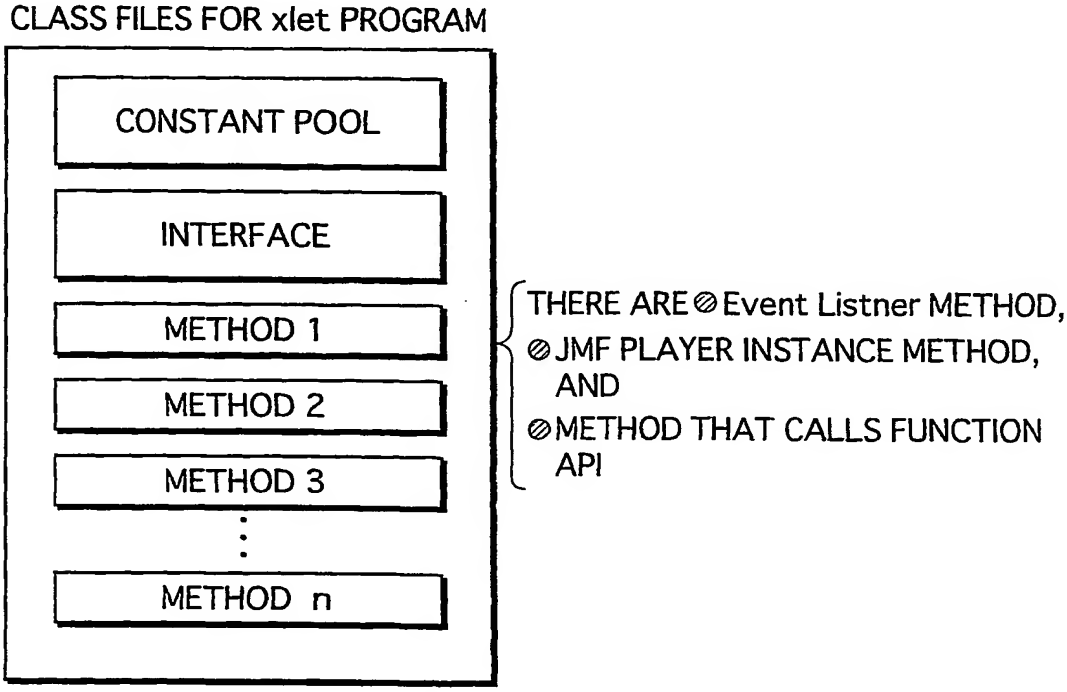


FIG.18B



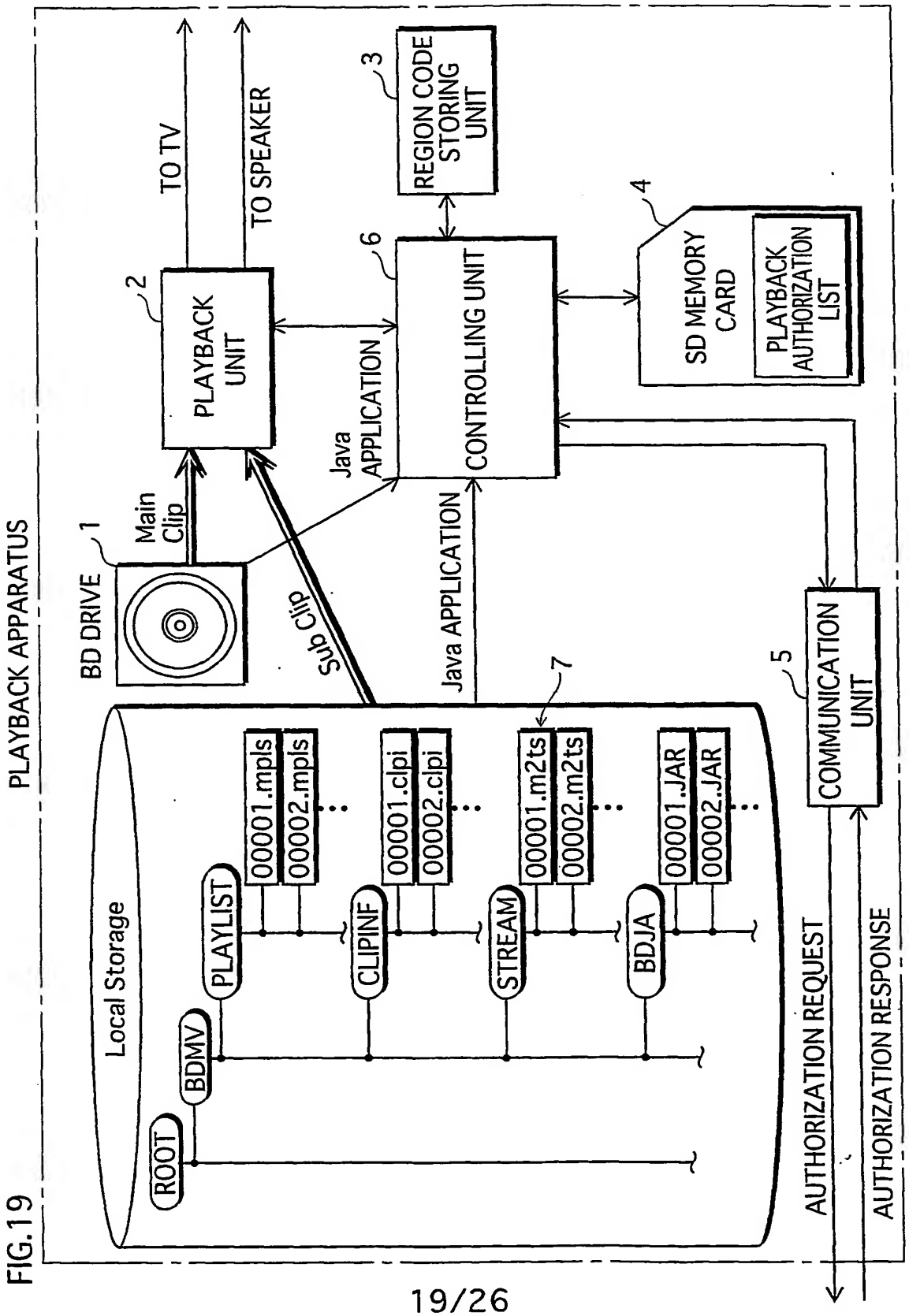

PLAYBACK APPARATUS
BD DRIVE
1
Main Clip
Sub Clip
PLAYBACK UNIT
2
TO TV
TO SPEAKER
REGION CODE STORING UNIT
3
CONTROLLING UNIT
6
Java APPLICATION
Java APPLICATION
SD MEMORY CARD
4
PLAYBACK AUTHORIZATION LIST
COMMUNICATION UNIT
5
7
Local Storage
ROOT
BDMV
PLAYLIST
CLIPINF
STREAM
BDJA
00001.mpls
00002.mpls
00001.clpi
00002.clpi
00001.m2ts
00002.m2ts
00001.JAR
00002.JAR
AUTHORIZATION REQUEST
AUTHORIZATION RESPONSE

FIG.19

FIG.20

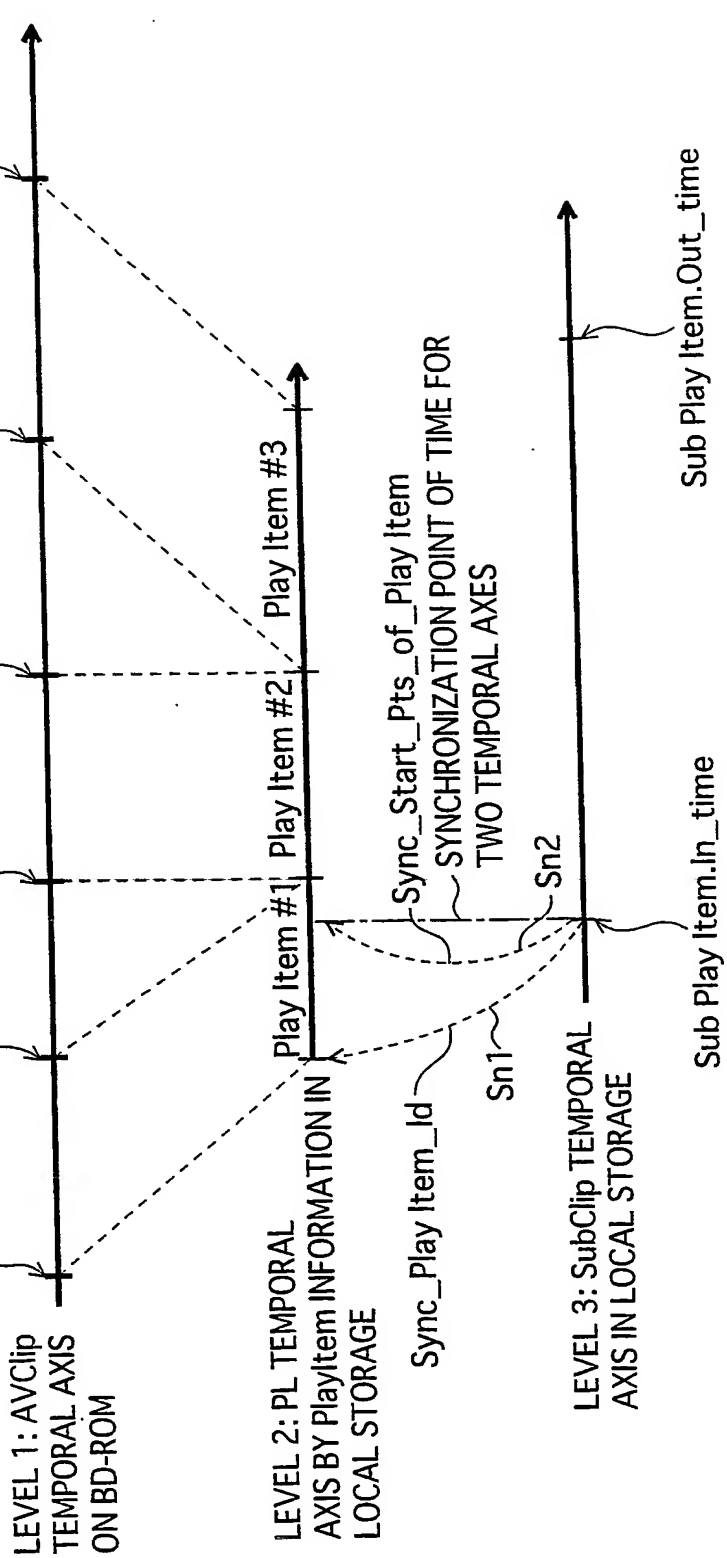

Play Item #1.In_time
Play Item #1.Out_time
Play Item #2.In_time
Play Item #2.Out_time
Play Item #3.In_time
Play Item #3.Out_time
LEVEL 1: AVClip TEMPORAL AXIS ON BD-ROM
Play Item #1
Play Item #2
Play Item #3
LEVEL 2: PL TEMPORAL AXIS BY PlayItem INFORMATION IN LOCAL STORAGE
Sync_Play Item_Id
Sync_Start_Pts_of_Play Item
SYNCHRONIZATION POINT OF TIME FOR TWO TEMPORAL AXES
Sn1
Sn2
LEVEL 3: SubClip TEMPORAL AXIS IN LOCAL STORAGE
Sub Play Item.In_time
Sub Play Item.Out_time

FIG.21

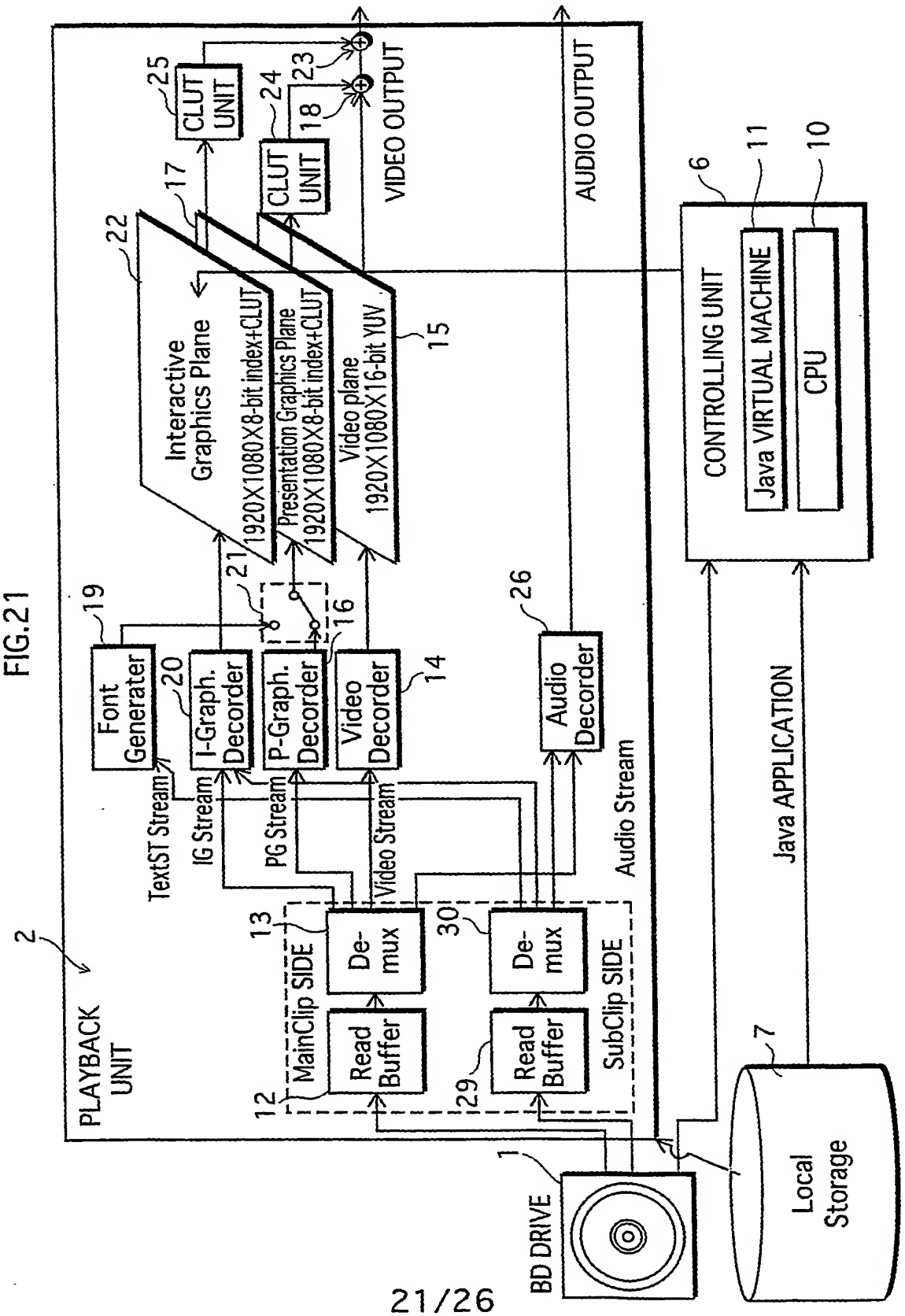

2
PLAYBACK UNIT
1
BD DRIVE
7
Local Storage
6
CONTROLLING UNIT
11
Java VIRTUAL MACHINE
10
CPU
Java APPLICATION
VIDEO OUTPUT
AUDIO OUTPUT
25
CLUT UNIT
24
CLUT UNIT
23
18
17
22
Interactive Graphics Plane
1920X1080X8-bit index+CLUT
Presentation Graphics Plane
1920X1080X8-bit index+CLUT
Video plane
1920X1080X16-bit YUV
15
21
16
19
Font Generater
20
I-Graph. Decorder
P-Graph. Decorder
Video Decorder
14
26
Audio Decorder
TextST Stream
IG Stream
PG Stream
Video Stream
Audio Stream
13
MainClip SIDE
De-mux
30
SubClip SIDE
De-mux
12
Read Buffer
29
Read Buffer

FIG.22

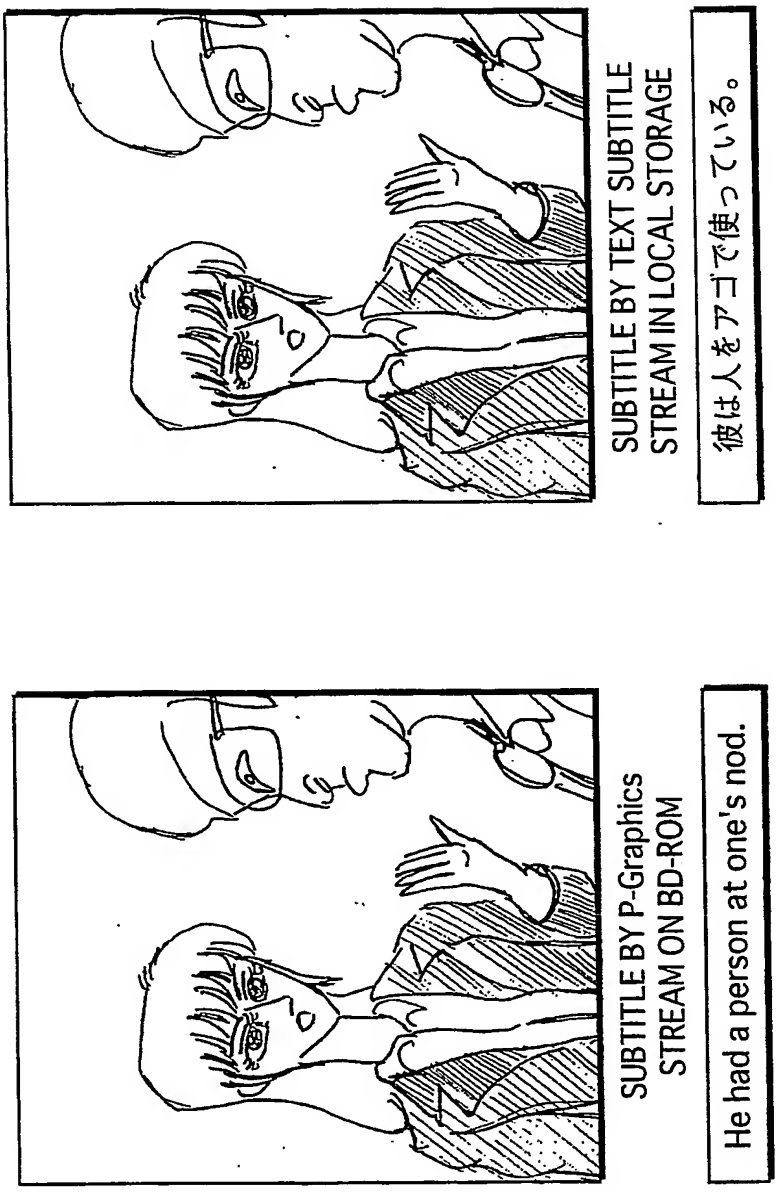

SUBTITLE BY P-Graphics
STREAM ON BD-ROM
He had a person at one's nod.
SUBTITLE BY TEXT SUBTITLE
STREAM IN LOCAL STORAGE
彼は人をアゴで使っている。

FIG.23A

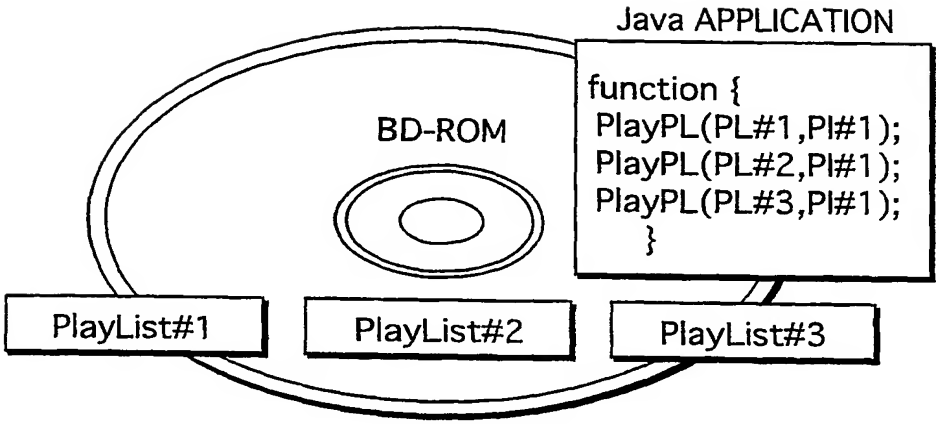


FIG.23B

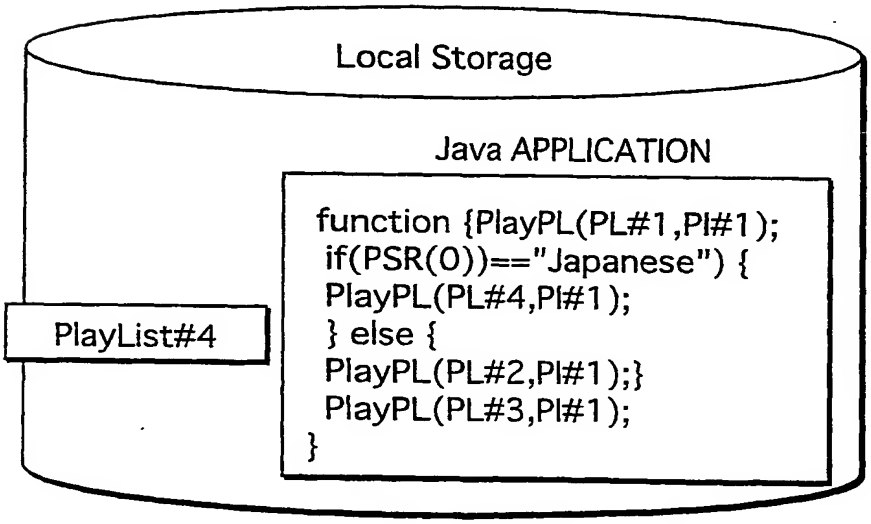


FIG.24A

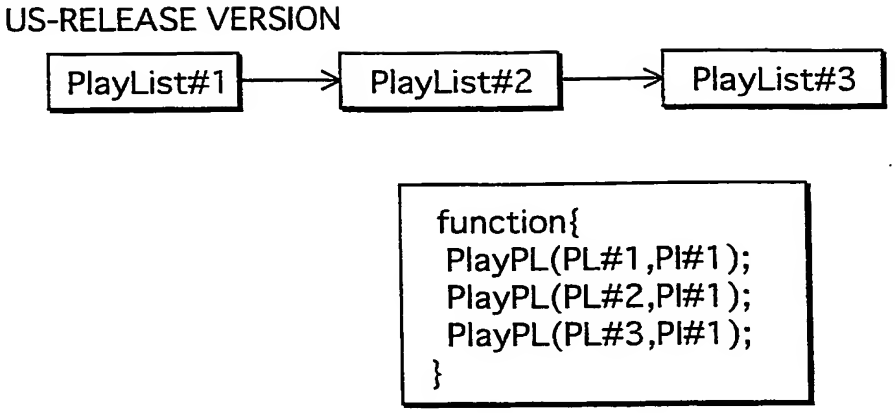


FIG.24B

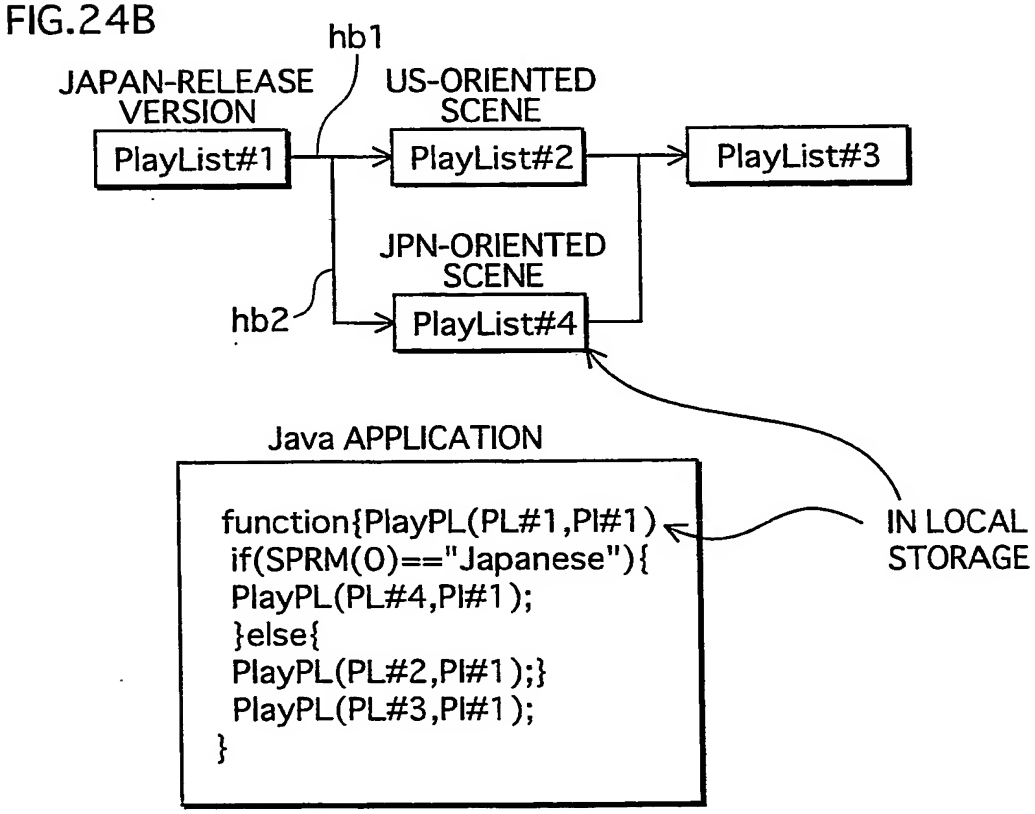


FIG.25

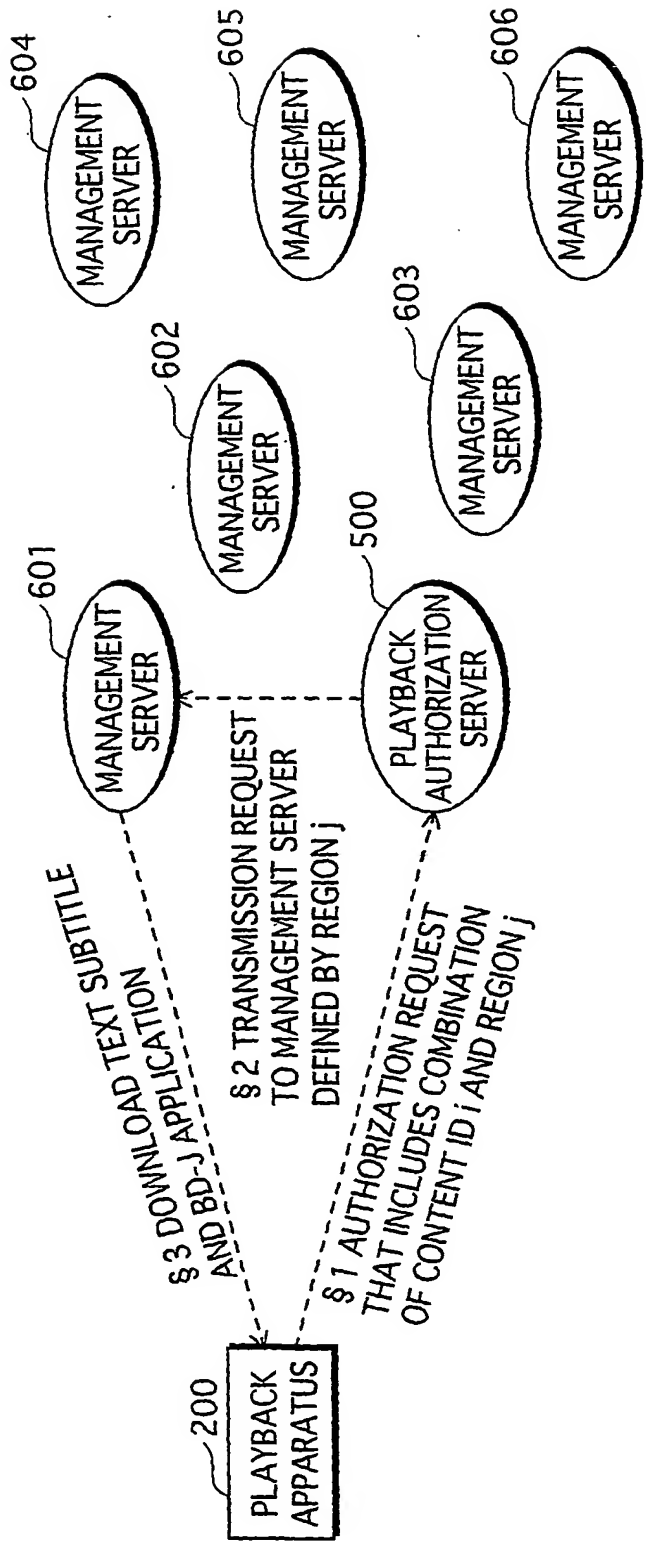
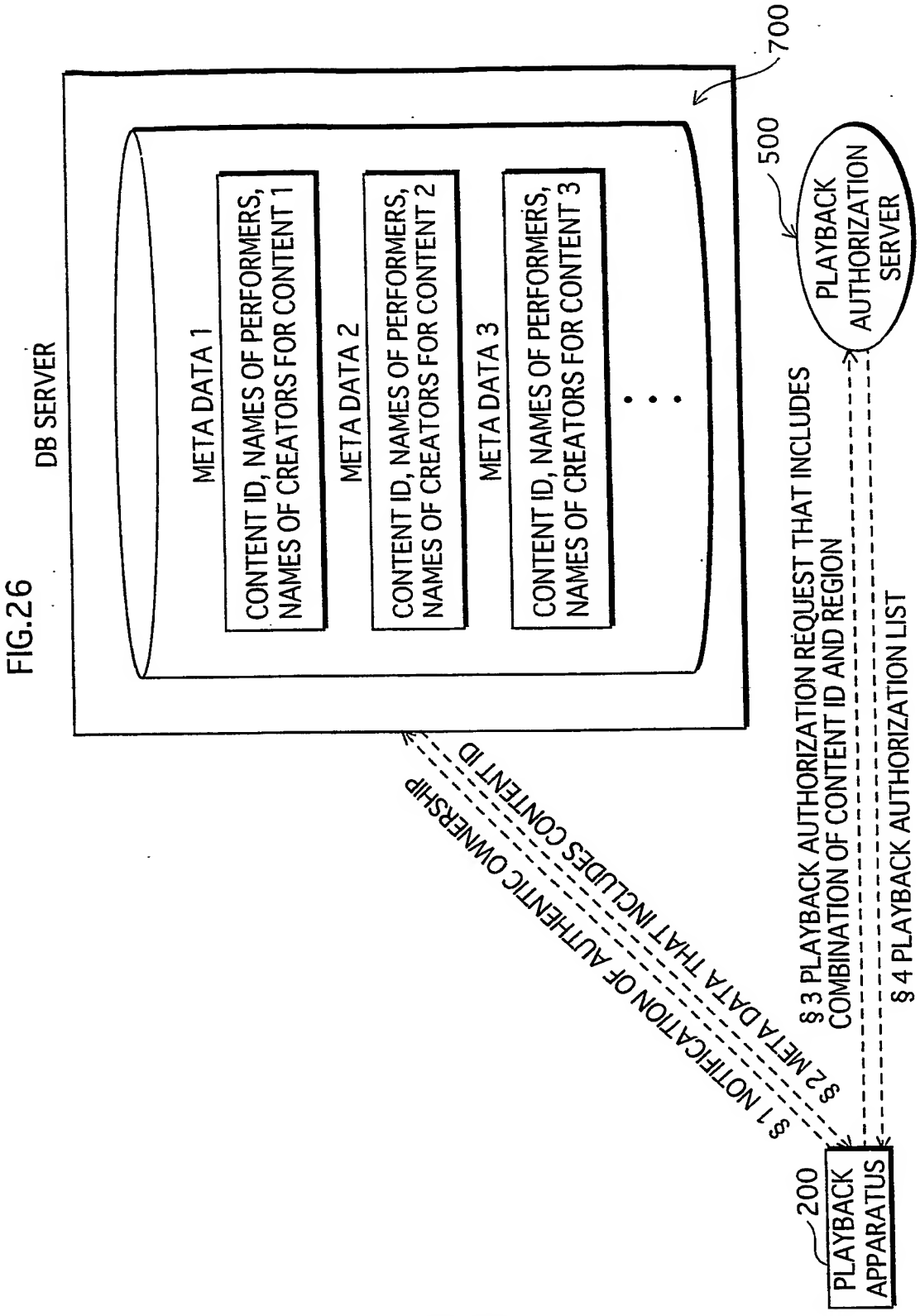

604
MANAGEMENT SERVER
605
MANAGEMENT SERVER
606
MANAGEMENT SERVER
602
MANAGEMENT SERVER
603
MANAGEMENT SERVER
601
MANAGEMENT SERVER
500
PLAYBACK AUTHORIZATION SERVER
200
PLAYBACK APPARATUS
§3 DOWNLOAD TEXT SUBTITLE AND BD-J APPLICATION
§2 TRANSMISSION REQUEST TO MANAGEMENT SERVER DEFINED BY REGION j
§1 AUTHORIZATION REQUEST THAT INCLUDES COMBINATION OF CONTENT ID i AND REGION j

FIG.26


700
DB SERVER
META DATA 1
CONTENT ID, NAMES OF PERFORMERS, NAMES OF CREATORS FOR CONTENT 1
META DATA 2
CONTENT ID, NAMES OF PERFORMERS, NAMES OF CREATORS FOR CONTENT 2
META DATA 3
CONTENT ID, NAMES OF PERFORMERS, NAMES OF CREATORS FOR CONTENT 3
500
PLAYBACK AUTHORIZATION SERVER
§1 NOTIFICATION OF AUTHENTIC OWNERSHIP
§2 META DATA THAT INCLUDES CONTENT ID
§3 PLAYBACK AUTHORIZATION REQUEST THAT INCLUDES COMBINATION OF CONTENT ID AND REGION
§4 PLAYBACK AUTHORIZATION LIST
200
PLAYBACK APPARATUS